

Hololampra, Saussure, 1864, replaces the more familiar *Aphlebia*, Brunner, 1865.

But this catalogue should be received less with criticism than with gratitude to the painstaking author, and we hope the second volume will appear at an early date; it will doubtless include such omissions as have been unavoidable in the first volume, owing to the time necessary for publication.

M. B.

Percentage Tables for Elementary Analysis. By Leo F. Guttman, Ph.D. Pp. 43. (London: Whittaker and Co., 1904.) Price 3s. net.

THIS book is only intended to facilitate the calculation of the results of an ordinary organic analysis, and its title, therefore, is somewhat misleading. It is stated that "the tables have been carefully calculated and checked, they are therefore absolutely accurate." After this statement, nothing is left to us but to see if they are likely to be useful. After careful consideration of this question we are compelled to give an unfavourable reply. If we have the analytical result that 0.1173 gr. of a substance gave 0.2869 gr. carbon dioxide, we can, in the ordinary course of things, by looking out the logarithm of 0.2869, adding the easily remembered logs. of 12/44 and of 100, and subtracting the log. of 0.1173, get the log. of the percentage. But according to the tables before us, we look out a number corresponding to 0.117 and 0.28. We then look again for a number corresponding to 0.118 and 0.28. We subtract the two numbers, multiply by 0.3 by means of another table, and subtract this result from the first number looked out. We next find a number corresponding to 0.117 and 0.69, divide by 100 and add this result, and thus, after four references to tables, two arithmetical operations in the head, one subtraction and one addition on paper, we get our percentage. Appeal to a chemist constantly engaged in organic analysis has only confirmed the view that these tables are unlikely to save time or to promote exactitude in the calculation of organic analyses.

A. S.

How to Photograph with Roll and Cut Films. "The Amateur Photographer" Library, No. 30. By John A. Hodges. Pp. xviii+120. (London: Hazell, Watson, and Viney, Ltd., 1904.) Price 1s. net.

THE ever increasing number of photographers and more especially amateurs, who work with either roll or cut films, will find in these pages all the necessary information for the production of pictures. The author does not pretend to have written a treatise on the whole art and science of photography, but he has given a straightforward account of the various operations that have to be completed to ensure good results. The treatment is well suited for amateurs, and the numerous well reproduced illustrations serve admirably to render many points clear.

The Telescope. By Thomas Nolan. (New York: D. Van Nostrand Company, 1904.) Price 50 cents.

THE first edition of this small treatise on the elementary principles of optics as applied to telescopes appeared in 1881. In the present issue the author has left this matter practically as it first appeared, with only one or two minor corrections, but has added a chapter describing in a brief manner the advances that have since been made. At the end is also given a bibliography relating to the telescope, which will be of service to those who wish to study more in detail different branches of the subject to which slight references only have been given. The book is published in the Van Nostrand Science Series, and should prove a useful addition.

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LETTERS TO THE EDITOR.

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The Infection of Laboratories by Radium.

IN a recent attempt in the physics building of McGill University to make electroscopes with a very small natural leak, repeated failures were encountered. The rate of discharge of several instruments, carefully made, was found to be about sixty to one hundred times as large as that obtained by Mr. H. L. Cooke two years earlier in the same building. At first it was supposed that the insulation of the sulphur bead was defective. But the natural leak was large and unaffected when the upper support of the sulphur bead was raised to a higher potential than the gold leaf system, so that the insulation was not at fault. Nor was the rate of discharge altered when the electroscope was entirely surrounded by lead one inch thick. Removal to another building produced no effect on the leak of the electroscope. It appeared probable that the trouble was due to the radio-activity of the materials from which the electroscope was made. A rude instrument, made in a private house with a tobacco tin, the amber mouthpiece of a pipe, and a cork, was found to give better results than the most carefully constructed instrument in the physics building. Some electroscopes were next made in the chemistry building, using materials which had never been into the physics building. Instruments with a very slow rate of discharge were now easily manufactured. These were used to test materials from various parts of the physics building, and it was found that all were infected with excited activity. Sheets of mica, lead foil, iron, zinc and tin were all active, even when taken from drawers or cupboards.

Of the substances tested, the only one which showed no activity was some thin Dutch metal leaf kept between tissue paper in a closed drawer. About 90 per cent. of the excited activity could be removed from the metal sheets by strong hydrochloric acid, but the activity was transferred to the solution. It was also possible to volatilise a portion of the deposit by raising the metal sheet to a red-heat in a Bunsen flame. Both α and β rays were detected, but it was difficult to measure their exact proportion. The natural leak of an electroscope was increased to a measurable extent when a mica window was replaced by one cut from a sheet of mica kept in the physics building.

The difficulty of conducting radio-active experiments in rooms where strong preparations of radium were present was early observed by Madame Curie, and later by Elster and Geitel, but the present experiments seem to show that the effect may be widely spread. The emanation from radium used in the large physics building has passed by convection and diffusion into various rooms. In a few days each fresh supply of emanation is transformed into the rapidly changing substances radium A, B, and C. The further changes of the products of radium have been investigated by Prof. Rutherford, and described by him in his Bakerian lecture (*Phil. Trans.*, vol. cciv., pp. 169-219), and in a recent letter to NATURE (February 12). In the former he has pointed out that bodies exposed to the air in the open will be covered with an invisible film of radio-active matter of very slow rate of change, and that the strong radio-activity observed in a room in which radium preparations have once been used is probably due to the deposit on the walls of the room of this slowly decaying matter from the emanation. In his letter to NATURE, he has shown that radium C gives rise to radium D, and that the further change to E is rayless in character and attains half value in forty years. The further change to F emits β rays, and reaches half value in six days, whilst the change from F to the final product is accompanied with α rays, reaching half value in 150 days.

The α and β rays emitted by the coating on the materials in the physics building are doubtless due to the changes above mentioned. If the supply of emanation were arrested at the present date, the activity already deposited would rise to a maximum in two or three years, and then gradu-

ally decay, following an exponential law, and reaching half value in forty years. But should the supply of emanation in the future equal that in the past, the activity would continue to increase in magnitude for the next hundred years or so, until the supply and decay of radium D attained a steady value. By that time radio-active experiments of a delicate nature would become difficult or impossible, as the excited activity would rapidly discharge a gold-leaf electroscope.

As the excited activity can be largely removed by acid, the infection will at present cause no serious difficulty in the majority of experiments on radio-activity, particularly as the leak arising from it remains almost constant for weeks or months. But when an electroscope with a very small natural leak is required, it will be necessary to employ fresh materials which have not been exposed to emanation.

It appears desirable, in the case of laboratories not yet infected, to keep radium in sealed vessels, and to blow the emanation into the open air, and not into the rooms of the laboratories.

A. S. EVE.

McGill University, Montreal, February 25.

International Atomic Weights.

THE committees engaged in revising the tables of atomic weights have now sent in their reports for 1905. The one which appeared in the *Berichte* is, of course, printed in German, and that which has just been circulated by the Chemical Society is in English.

Unfortunately, there is a want of uniformity in the naming of the elements. Thus, in the English table we find Glucium, Gl, and Columbium, Cb, whereas in the German table these elements are called Beryllium, Be, and Niobium, Nb, respectively. Historically, no doubt, the names adopted in the English table are more accurate. But in all text-books the names and symbols employed in the German tables are used, and have been for many years.

It is difficult to see where the advantage in making the change comes in, but, on the other hand, the disadvantages of having two forms of nomenclature are obvious.

F. MOLLWO PERKIN.

London, March 8.

The Planet Fortuna.

PERHAPS Airy quoted his Juvenal correctly, which "W. E. P." (p. 410) has failed to do. The poet was so well satisfied with the lines that he gives them twice, in his tenth and fourteenth satires. And they run thus:—

Nullum numen habes, si sit prudentia; nos te
Nos facimus, Fortuna, deam cæloque locamus.

W. T.

THE lines are variously quoted, and I cannot say what version Airy favoured. I believe he spoke from memory.

W. E. P.

COSTA RICA.¹

UP to 1540, Spain had reserved for the crown that part of the territory of Veragua lying west of the portion which had been granted to the heirs of Columbus; but, in that year, it was erected into a province and called Costa Rica. It lies between Nicaragua and the newly hatched, but featherless, republic of Panama, and is the smallest State of the New World except Salvador. But it is one of the most interesting, for, with Panamá, it forms the connecting link between North and South America, not only physically but ethnologically. If more were known of its ancient inhabitants, their type, character, modes of life, habits and customs, inter-tribal relations and forms of worship, and of the ruins of ancient towns and burial places which are silently dotted over the country, one might go

¹ "Archæological Researches in Costa Rica." By C. V. Hartman. The Royal Ethnological Museum in Stockholm. Pp. 195; map +87 plates. (Stockholm: C. E. Fritzes, 1901.)

far towards a solution of many vexed problems as to the relation between early Mexican culture and that of the Andean peoples—Chibchas of ancient Cundinamarca, the Quitos and Cañaris of Ecuador, the Quichuas and Aymaras of the Inga empire. Much of the data necessary to the formation of a just conclusion are buried on the slopes of the volcanoes of Turrialba, Irazu, Barba and Poas, and, in that richest of fields for archæological research, the district lying between Lake Nicaragua and the Gulf of Nicoya on the Pacific coast of Costa Rica, while the lowlands lying between Nicaragua and the Atrato River of Colombia probably hide, under their densely matted and almost impenetrable vegetation, whatever evidences may exist of their occupation by man, not only in the far-remote past, but even at the date of the Spanish conquest.

Hence we may welcome a scientific examination of any section of the region outlined above, but especially when the results are so carefully and clearly set forth as they are in the work under review—a large quarto volume richly illustrated. Its publication, as well as the explorations of which it treats, have been made at the expense of Mr. Åke Sjogren, who has presented to the Royal Ethnological Museum of Stockholm the valuable archæological collection with which Mr. Hartman returned home. This gentleman, whose studies had well equipped him for his task, proceeded to Costa Rica in 1897, where he remained more than a year in the territory once occupied by the Guétare race. He commenced his researches in May (the beginning of the rainy season) near the *hacienda* of Mercedes, which is situated on the Guapiles branch of the Costa Rica Railway, about fifty miles from Port Limon.

"On the Atlantic side, the moisture-laden atmosphere and tropical heat have clothed the mountain chains and the low swamp lands with eternal verdure, with forests which are almost impenetrable, woven together as they are by lianas passing from tree to tree. Neither aboriginal nor Spanish culture ever made great inroads on the primeval forests of the Atlantic coast."

Near Mercedes is a mound about 100 feet in diameter at the base, 65 feet at the top, and 20 feet high. It is in a partially walled enclosure, and probably served as a platform on which to erect statues facing the rising sun. The mound may have been covered with a wooden structure with a thatched roof. Among the many human figures found there, all mutilated, were two of life size one of which is notable as having ear plugs. The chest and back are crossed by two thick ropes, which pass over the shoulders and reach to the hips. The right wrist supports a human head. The other large statue has its hands resting on the hips. The heads of both figures are covered with conical hats. Rudely sculptured representations of alligators, pumas, and other animals were found, but in fragments. All of these, including the statues, were cut from hard, basaltic lava.

Mr. Hartman also examined the extensive burial places of the ancient inhabitants of this district, and opened a great number of cists. These varied in dimensions, but it is apparent that they were rarely intended for the interment of more than one person. They had side and end walls of cobble stones, but the bottom and top were of slabs of limestone. The horizontal section of the cists was very irregular. Only in one did he find traces of bone, but the "dark soil near the bottom seemed to prove that the body or bodies had been placed there."

Many vessels of burnt clay, sometimes roughly